

# Oval full cone nozzle Series 4PM.291

## New nozzle generation with an innovative internal design providing the nozzle with:

50 % to 60 % larger cross sections compared to conventional oval cone nozzles  
Non clogging characteristics due to larger free cross sections

Extended machine availability and reduced maintenance costs

### Series 4PM.291

Oval full cone spray pattern  
90° x 60°  
Spray width: 90°  
Spray depth: 60°

#### Applications:

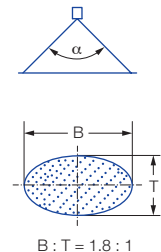
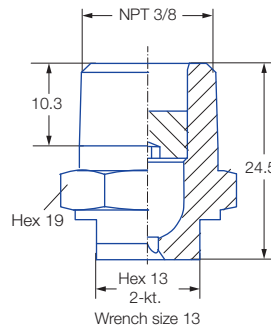
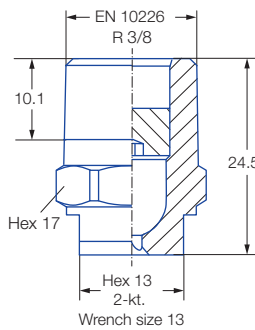
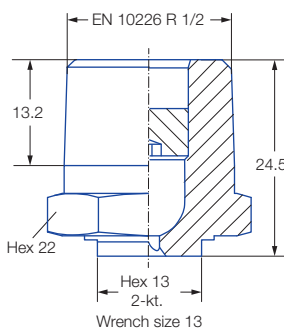
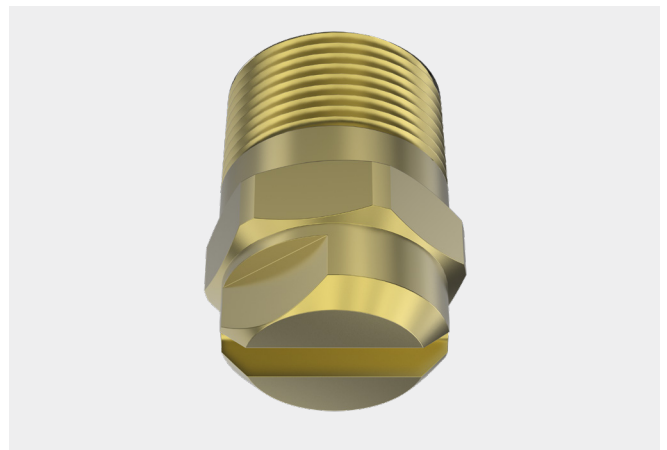
Single and multi-nozzle arrangements in segments for water-only secondary cooling in bloom and slab casters. Ideal for foot roller spray positions to prevent mould edge erosion by replacing flat fan nozzles. Also suitable for vertical spray positions such as narrow side cooling in slab casters or vertical spray cooling in bloom casters.

#### Further applications:

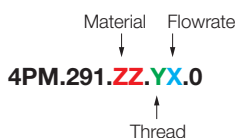
- Strand cooling in billet casters
- Strand narrow side cooling in slab casters
- Spray cooling of billet moulds
- Spray cooling of EAF electrodes after use

#### Remark:

Material combination **T8** brass for the nozzle housing and AISI 316L for the vane, or completely made from AISI 316L **1Y** is recommended if the nozzles will be exposed to high temperatures for longer periods of time.



Ordering no.	Mat. no.			Narrowest cross section [mm]	Flow rate [l/min] pressure (bar)					
	1Y 316L SS	30 Brass	T8 Brass/ 316L SS		1	2	3	5	7	10
4PM.291.ZZ.Y6.0	○	○	○	1.7	1.5	2.0	2.4	3.1	3.6	4.3
4PM.291.ZZ.Y4.0	○	○	○	2.0	2.0	2.7	3.3	4.2	4.9	5.8
4PM.291.ZZ.Y5.0	○	○	○	2.2	2.4	3.4	4.1	5.2	6.1	7.2
4PM.291.ZZ.Y0.0	○	○	○	2.5	3.2	4.4	5.3	6.8	8.0	9.4
4PM.291.ZZ.Y1.0	○	○	○	2.9	4.2	5.9	7.1	9.0	10.5	12.5
4PM.291.ZZ.Y2.0	○	○	○	3.3	4.9	6.8	8.3	10.5	12.3	14.5
4PM.291.ZZ.Y7.0	○	○	○	5.0	11.5	16.0	19.3	24.6	28.8	34.1



**X:** Flowrate  
**Y:** Thread (0 = 3/8" BSPT, 1 = 3/8" NPT, 7 = 1/2" BSPT)  
**ZZ:** Material or secured swirl insert  
(30 = brass, T8 = secured insert by material combination SS-brass, same as for 490 nozzles)

#### Examples:

- 4PM.291.30.04 = Flowrate Type 4, Material: brass, Thread : 3/8" BSPT
- 4PM.291.30.14 = Flowrate Type 4, Material: brass, Thread : 3/8" NPT
- 4PM.291.18.14 = Flowrate Type 4, Material: housing brass – insert SS, Thread : 3/8" NPT

Conversion formula for the above series:  $\dot{V}_2 = \dot{V}_1 * \left(\frac{p_2}{p_1}\right)^{0.47}$   
( $\leq 10$  bar)